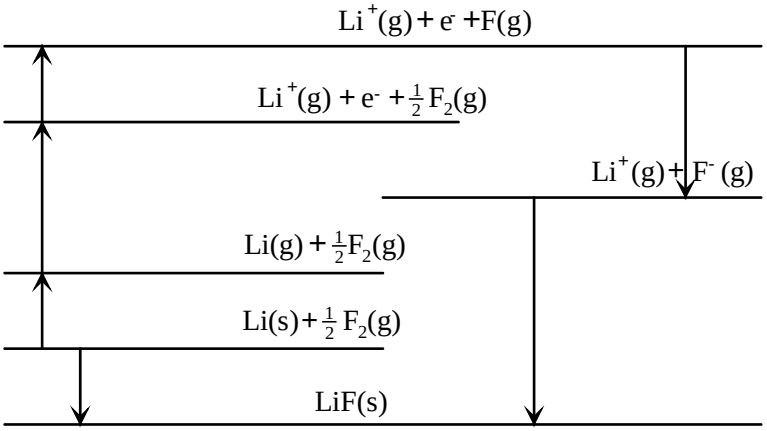
**T15D11 – HL Born-Haber Practice MS**

**1.** B

**2.** B

**3.** D

**4.** (a) 6



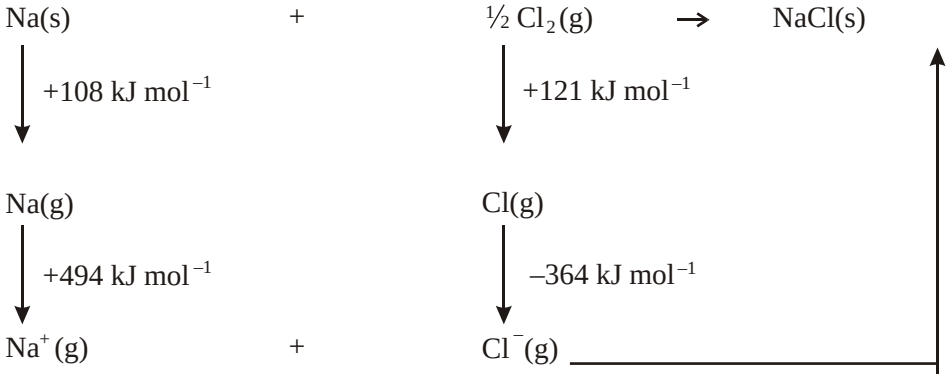

*Award **[6]** for completely correct cycle, with endothermic processes in any order.*
*Deduct **[1]** for each line in which species symbol and/or state symbol is incorrect or missing.*
*Penalize missing electrons once only.*

(b) bonding in AgF more ionic than in AgI/bonding in AgI more covalent than in AgF;
*Accept AgF is ionic and AgI is covalent.*
values closer/in better agreement in AgF/big(ger) difference in values for AgI/*OWTTE*; 2 **[8]**

**5.** (i) lattice enthalpy for a particular ionic compound is defined as Δ*H* for the process, $MX(s) \rightarrow M^+(g) + X^-(g)$;
*Accept definition for exothermic process*
electron affinity is the energy change that occurs when an electron is added to a gaseous atom or ion; 2

(ii)

$$\Delta H_f^{\ominus} = -411 \text{ kJ mol}^{-1}$$




lattice enthalpy = –[(–411) – (+108) – (+494) – (+121) – (–364)]
= 770 (kJ $mol^{-1}$)
*Award **[2]** for all correct formulas in correct positions on cycle diagram.*
*1 incorrect or missing label award **[1]**.*
*Award **[1]** for all correct values in correct positions on cycle diagram.*

calculation of lattice enthalpy of NaCl(s) = 770 (kJ $mol^{-1}$); 4
*Allow ECF.*
*Accept alternative method e.g. energy level diagram.*

(iii) lattice/network/regular structure;
each chloride ion is surrounded by six sodium ions and each sodium ion is surrounded by six chloride ions/6:6 coordination; 2 **[8]**